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SWELLING COALS

THE subject of "Practical Experience in the Coking of Dangerous Low Ash Coals" seems far remote from the experiences in the Gas Industry. There are no doubt low-ash coals in the country, but the Gas Industry remembers them only with feelings akin to nostalgia. No doubt the time will come when we shall once again be able to carbonize coal containing less than 5% of ash. "Dangerous" coals, however, is a new conception to most gas engineers. A Paper with that title was read by Mr. D. T. Barritt to the Yorkshire Section of the Institute of Fuel last month, and the experiences which the Author described will be of considerable practical interest in the Coking Industry and of rather more than academic interest in the Gas Industry. A special abstract of the Paper appears in our columns to-day.

What constitutes a "dangerous" coal requires some explanation. Broadly speaking, a dangerous coal is one which during carbonization causes structural damage to the walls of a carbonizing oven or retort. It may be that those who carbonize coal in vertical retorts, for example, will point to erosion due to the action of ash in the steaming zone or to spalling at the top of the chamber as evidence of "danger." Whether these occur as a consequence of using a specific coal does not seem to be very clear, though it is obvious that if ash is liberated from the coke by heavy steaming some ashes are likely to have a greater fluxing effect than others. The types of damage generally encountered in vertical retorts, however, are not those encountered in the coke oven from what are termed in that industry "dangerous" coals. A "dangerous" coal causes structural damage to the oven wall during carbonization which may result in bad cases in collapse of the wall, and which does not partake in any way of the nature of erosion.

When coal is carbonized in a coke oven the charge, which is a rectangular slab possibly 40 ft. long, 12 ft. high, and 18 in. wide, is heated from each of the 40 ft. × 12 ft. sides. A plastic layer is formed at each side through which gas is passed with considerable difficulty, if at all, the degree of difficulty depending upon the coking properties of the coal. If the gases generated on the cooler side of the plastic layer cannot escape easily they will set up an internal pressure. With most coals this internal pressure is negligible. When the two plastic layers finally meet in the centre of the oven all the conditions are present for a pressure peak, and it is in practice found that for a few minutes at this time the pressure set up may reach considerable values. This pressure is obviously exerted laterally so that the partly carbonized charge tends to "elbow" the wall. Some years ago the late Dr. Koppers investigated the stability of coke oven walls and ascertained by practical experiment that with a wall 14 ft. 9 in. high a pressure as low as 0.09 kg/sq.cm. (1.28 lb./sq. in.) was sufficient to produce initial distortion. Coke ovens have, therefore, only small resistance to lateral pressure.

It is probable that this pressure peak occurs in every coking coal at the time when the plastic layers meet and persists until the plasticity has been so far reduced by increasing temperature that the gases can escape readily. It only becomes dangerous when the coke is in contact with the wall. With many coals, and all gas coals, the coke shrinks during carbonization so that there is a gap between the oven charge and the wall. The internal pressure may not be sufficient to cause the coke to press against the wall if there is already a gap. If there is not a gap, however, the full pressure will be exerted directly against the oven walls, and the oven walls will be damaged. It can be stated broadly that for a coal to be dangerous it must be of high coking power and not subject to shrinkage in the oven, which means in effect that it must be of comparatively low volatile content. The density of the charge (lb./cu.ft.) will also affect the swelling pressure.

This difficulty did not arise in the earlier coking practice for two reasons. One was the comparatively small area of the oven heating wall, which increased its effective strength; the other was the lower flue temperatures, which reduced the resistance of the plastic layer to the passage of gas. With the increase in the size of the ovens and the use of high flue temperatures difficulties began to occur in the Ruhr in the 1920's. It is believed that the difficulties first occurred in modern high-duty ovens built by Dr. Koppers in Germany about 1925 or just after; at this time Koppers was constructing his "taper" oven in which the oven chamber tapered from top to bottom. The damage was first ascribed to the taper, the upward thrust of the coal causing the wall bricks to lift. Events soon proved that this was not the basic reason and that there existed quite a number of coals which under the new conditions gave rise to dangerous lateral swelling pressures of the kind recounted earlier in these notes. Koppers himself did a great deal of experimental work and devised two forms of laboratory apparatus designed to give empirical warning of the presence of dangerous coals.

An essential difficulty of the problem was that of correlating the test with the behaviour of the coal since only when an oven battery had been destroyed by a swelling coal could a coal be proved to be dangerous; such occurrences were, fortunately, rare. Koppers was able to lay down certain rules governing the interpretation of the indications of his apparatus, but there remained considerable uncertainty. Mott, in England, discovered anomalies which he maintained could be obviated by removing the fines below about ½ mm. from the sample before testing. Some maintained that this in itself was a dangerous innovation since the fines might contain more vitrain and clarain than the larger coals. Other experimenters in Germany and America carried on the work, and modifications of the Koppers method were devised. The American workers set up a coke oven chamber with an expanding wall to test the pressure. This had the disadvantage that the charge was heated from

one side only so that the dangerous swelling pressure caused by the junction of the plastic layers was not brought into play.

The position at the outbreak of the war was that there was wide recognition of the possibility of dangerous swelling pressures being developed in coals, that some oven builders were nervous and perforce played for safety, and that there was no recognized test which gave certain indications. It was widely believed, for example, on the basis of the Koppers test, that certain Durham coals were dangerous. The position is that while some Durham coals may be potentially dangerous if safe operating conditions are not maintained, under conditions so far met it is believed that no case of oven damage from this cause has arisen from any Durham coal. There was much empirical information; the underlying causes of the damage had been suggested by Koppers, and others, but there was little practical published experience.

DIFFICULTIES EXPLAINED

THE Simon Carves Company and Mr. D. T. Barritt have performed a real service to the carbonizing industries in making public a difficulty which they have encountered in the use of coals thought to be safe but which subsequently turned out to be dangerous. It has already been remarked that the bulk density of the charge affects the degree of safety with which any given coal can be used. In an oven charged from the top the charge has a bulk density of between 40 and 50 lb./cu.ft.; when the oven is charged with a compressed cake—which was, of course, formerly the universal practice—the density of the charge may increase to 60 or 70 lb./cu.ft. Compressed charges, where the coal particles are relatively more closely packed, may result in a coal which is safe to top-charge exerting a dangerous swelling pressure when compressed-charged.

Kilsyth Coking Seam coal was selected for the production of low-ash coke for the manufacture of carbon electrodes. The specification for this coke demanded a bulk density of not less than 28 lb. per cu.ft. measured on coke below ½ in. with material below ⅛ in. screened out, volatile matter not above 1%, and an ash content not above 1.5%. Economic considerations made it necessary to use tall ovens of a size which had not been previously compressed-charged in this country. When tested in 1938 the coals to be used at this plant were found to contain respectively 28.65% and 26.35% of volatile matter on the dry ash-free basis; but by the time the plant was put to work in January, 1941, the volatile matter content had fallen respectively to less than 24% and 23%. This fall passed unnoticed because naturally one does not anticipate a change of this sort in a seam of coal in the course of a few months. It was subsequently found that the cause had been due to an igneous sill above the seam which had changed its character. During the years that elapsed while the plant was being built the mine workings had advanced to a district where the effects of this sill had become apparent. Consequently the coal had changed in character.

The result was that although the ovens operated satisfactorily for a short time it was soon found that the coke was rather tight in the oven and that the working margin was small. Difficulties in discharging the oven began after 10 days and the operators tried many different methods to reduce the trouble. A large part of Mr. Barritt's Paper is taken up by a description of the methods that were tried. We shall not follow the Author into the technicalities of the measures that were taken, because to do so would virtually involve repeating a great portion of the text of the Author's remarks. The problem was made more difficult by the requirement that the low-ash coke required for the manufacture of electrodes must have a high density and this density apparently could not be obtained without compressed charges. It will suffice to say that certain conclusions were reached which have been fully substantiated in subsequent practice. The oven to which these experiences apply was 19 in. in width with a length of 38 ft. 8½ in. and a chamber height of 11 ft. In order to charge the coal in a compressed state with any safety it was necessary to make a determination every day of the volatile matter content and of the swelling properties of the coals according to the Koppers test, the procedure being selected according to the results of these tests. It was found that this coal becomes dangerously swelling when charged in the form of compressed cakes having a density of 65 lb./cu.ft. whenever the volatile matter on the dry ash-free basis fell below 26.8%. The same coal when tested in the Koppers expansion apparatus at a charge density of 65 lb./cu.ft. wet must be classed as dangerously swelling in the form of compressed charges when the test shows a maximum of expansion during the test of over 1% or a final contraction at the end of the test of less than 5.7%. From the results of these two tests it is decided each day whether the coal should be top-charged or compressed-charged. If the coal was compressed-charged and its ash content were satisfactory, it could be used for the manufacture of electrodes; ovens that were top-charged produced foundry coke. It is of further interest to notice that, according to the experience on the Kilsyth plant, for a compressed charge to be safe the final contraction of the charge must not be less than 4.5% of the original charge height and the maximum vertical expansion of the charge at any time during carbonization must not exceed 1.2% of the original charge height.

PRECAUTIONS TO BE TAKEN

THE conclusions referred to in the last paragraph hold, of course, only for this particular plant and they are given here as an illustration of the precautions that must be taken. Carbonizing engineers will be interested also in the type of damage that was caused by dangerously swelling coals. Where it was possible to measure the distortion of the walls during the carbonizing period it was found to be confined to the ram side of the oven, mainly because, when withdrawing the charging peel, the tendency would be to increase the bulk density of the charge at that end. Damaged walls were nearly always uniformly bowed from top to bottom and when dismantled showed that the header bricks had broken due to the bending of the walls as a whole. The header bricks did not fail under compression nor were the stretcher bricks broken. For the benefit of gas engineers not familiar with coke oven construction it may be mentioned here that the stretcher bricks, as their name implies, stretch along the face of the oven wall, whereas the header bricks pass through the oven walls at right angles to the central plane of the charge. A second type of damage, consequent on the first, was due to the pressure exerted by the ram head on a charge of coke which was too tight to move without considerable pressure. The repeated efforts to discharge the coke in these circumstances led to the walls about 6 ft. to 8 ft. in from the ram side being distorted by ram pressure; this can happen even when coals are not dangerously swelling.

It is unlikely that gas-works will find themselves in difficulties with dangerous swelling coals because the type of coal employed for making gas is not normally sufficiently low in volatile content to be dangerously swelling. Nevertheless, it is a matter that should not pass unnoticed even in the Gas Industry. The Coking Industry will be greatly indebted to Mr. Barritt and his Company not only for giving this clear account of his experiences but for showing that, properly handled and interpreted, the Koppers test enables an estimate to be made of reasonable reliability as to whether a coal is safe or not.

NATIONALIZATION: STOCKHOLDERS' ANXIETY

WHILE the Chairmen of most gas companies have commented at this year's annual meetings on the question of nationalization, little has been said on the stockholders' side of the table, for the fairly obvious reason that the proprietors, the majority of whom individually hold only small amounts of stock, have implicit confidence in the Directors. The voice of the pensioner-stockholder was, however, raised at the annual meeting of the Tottenham and District Gas Company last week, not by any means in criticism of the Board, but by way of constructive suggestion. Mr. A. H. Henry, a retired officer of the Company, said that the Bill which the Government had pledged itself to introduce shortly for the nationalization of the Gas Industry had undoubtedly occasioned much anxiety and grave concern in the minds of holders of gas stocks. The fallacious assumption by the Government, put forward in relation to other utility industries, that Stock Exchange prices were a fair basis of valuation upon which nationalization should be effected would mean, if they assumed that the average holding per Ordinary stockholder in the Company was £500 and that the Stock Exchange quotation was 120, that the stockholder would receive, say, £600 of 2½ per cent. stock, yielding an annual gross income of £15, whereas the 5 per cent. dividend now declared, and paid for some years past, provided a gross income of £25 per annum. In other words there would be a diminution in income of 40 per cent. whatever the amount of Ordinary stock held.

Due to the foresight of the Directors and stockholders of the Company, a reserve fund had over a number of years been set up, which now amounted to £100,000, this fund having for its object the stabilization of dividends and other matters arising out of circumstances beyond the Directors' control. As the Company was now excluded from declaring any dividend in excess of 5 per cent. on the Ordinary stock, it would appear that the reserves so carefully built up might be disbursed in favour of the stockholders; unless otherwise dealt with, they might silently fade away into the coffers of the Government. To avoid such a catastrophe, Mr. Henry suggested that the reserve fund should be applied, in whole or in part, in the following manner:

First, by transferring to the trustees of the pension fund such sum as might be thought desirable to ensure the complete stability of the fund, having in mind that it must be increasingly difficult for the trustees to invest moneys at a reasonable rate of interest.

Second, by supplementing the superannuation allowances to old employees of the Company, the majority of whom were now over 65 years of age, who had retired prior to the war and were now finding it ever more difficult to maintain even a reasonable standard of comfort owing to the much increased cost of living and higher local and imperial taxation. This, he said, was particularly evident in the case of pensioners not eligible for the State old age pension. Some of those pensioners, taking account of the increased cost of living, were endeavouring to maintain and meet their increasing obligations on an income amounting to only about 40 per cent. of their previous income. A fortnight ago even the Chancellor of the Exchequer admitted that the cost of living had advanced 30 per cent. since 1939. A precedent for the increase of such pensions had already been created by the action of the Government in increasing the pensions of retired civil servants. Mr. Henry therefore hoped that whether nationalization of the Industry became operative or not something would be done to alleviate the difficulties, even distress, under which that class of the Company's pensioners now existed. The Chairman had referred to the transfer of £40,000 from the net revenue account for the payment of pensions outside the pension scheme. Although they had no information on the matter, they might perhaps be assured that it was intended to apply at least a proportion of that sum in the direction he had outlined.

Third, to provide for and pay some reasonable compensation to Directors for loss of office, which it would appear under nationalization was not contemplated. It would be within the knowledge of most stockholders that on amalgamation of gas undertakings Directors' compensation was generally met on the basis of seven years' purchase of their annual fees. Furthermore, it had been the policy of the Directors from time to time to co-opt to the Board valued chief officers of the Company who had rendered outstanding service. They, with all the other Directors, would suffer unduly in the event of the nationalization of the Industry.

However laudable these suggestions may be, it is doubtful, in view of the strict Parliamentary control already exercised over gas undertakings, whether they could be put into effect. Nevertheless, Mr. Henry was assured by the Chairman that his remarks would receive careful consideration, but he pointed out that they did not yet know whether in fact there was going to be a Bill to nationalize the Gas Industry, or what provisions it would contain. Earlier in the meeting one of the oldest pensioner-stockholders, who entered the Company's service in 1883 and had served or drawn a pension under six Chairmen, including, with Mr. E. C. Woodall, three generations of the Woodall family, had expressed apprehension at the prospect of the Tottenham and District Gas Company being superseded by "Attlee, Bevin, Shinwell and Co.," even though they might dangle the promise—with the emphasis on "promise"—of gas at 2s. per 1,000 cu. ft., and coke at 20s. a ton.

Personal

Mr. W. A. RADLEY has been appointed to represent R. & A. Main, Ltd., in the South West of England in place of Mr. K. H. POTTER, who has resigned his appointment for reasons of health.

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Mr. F. H. HALESTRAP, Chief Engineer and Director of Dewrance & Co., Ltd., retired recently and is succeeded by Mr. J. H. GIBSON. Mr. Halestrap remains a Director of the Company and will continue to act in a consultative capacity.

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Mr. W. A. GREEN, Distribution Engineer, Coatbridge Gas Company, has been appointed Distribution Superintendent to the Paisley Gas Department. Mr. Green went from Wolverhampton to Coatbridge in 1945. He took up his duties at Paisley on April 1.

* * *

Mr. ERIC JONES, who severed his 28 years' connexion with Parkinson & Cowan (Gas Meters), Ltd., during last year on account of illness, has recently undergone a serious major operation at the Middlesex Hospital and is now making a very satisfactory recovery.

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Major GWILYM LLOYD GEORGE, M.P., who recently became a Director of South Eastern Gas Corporation, and Mr. G. LE B. DIAMOND, Engineer and General Manager of the Rochester, Chatham, and Gillingham Gas Company, have been elected to the Board of the Dover Gas Company.

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The Board of Powell Duffryn Technical Services, Ltd., the new Powell Duffryn subsidiary whose formation was recently announced, has now been completed. Mr. ROBERT FOOT is the Chairman and the other Directors are Mr. EDMUND HANN, Chairman and Managing Director of Powell Duffryn, Mr. H. H. MERRETT, Chairman of Cory Brothers and of Gueret, Llewellyn and Merrett, and a Managing Director of Powell Duffryn, Mr. J. G. BENNETT, and Mr. W. L. BOON.

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At the annual dinner of the Sydenham Branch of the British Legion on Mar. 19 the President of the Branch, Lieut.-Colonel J. A. GOULD, M.C. (Distributing Engineer to the South Suburban Gas Company), was presented by the members with a certificate of life membership of the Legion as a mark of their esteem. Colonel Gould has been connected with the branch as Vice-President and President for many years. A number of employees of the South Suburban Gas Company are members.

Obituary

Mr. E. G. ELLIOTT, who for many years represented the Davis Gas Stove Co., Ltd. (Radiation, Ltd.), in Scotland and the North of England, retiring on pension in May, 1946, died at his home in Sunderland on Mar. 21.

News in Brief

Blackpool Corporation Gas Undertaking, estimated to lose £32,900 on the year just closing, is now expected to show a surplus of £6,732. The Committee has been informed that income for the closing year, estimated at £525,321, will be £60,041 greater, due to gas sales being up by £61,730 at £382,212. Although expenditure rose by £23,552, next year a surplus of £8,049 is expected with expenditure down by £9,000, with loan charges up by £3,000. The income is expected to rise to £589,115, an increase of £3,757 on the closing year.

Nearly 200 Members and Guests of the North Western Fuel Luncheon Club were received by Sir Frederick West and his daughter-in-law, Mrs. Lawrence West, at the President's House Party on Feb. 28. After the President had submitted the loyal toast at the dinner, Mr. W. M. Neighbors, of the American Consulate, gave the toast of Sir Frederick and expressed the sentiments of the assembly. The dinner was followed by dancing and entertainment, and notwithstanding the adverse weather conditions the function was unanimously voted a great success.

This Year the Engineering Society of King's College, London University, celebrates the centenary of its foundation. As far as we are aware that is the oldest Engineering Society in the world, while the only senior engineering body in existence before 1847 was the Institution of Civil Engineers. To mark the centenary, special celebrations are planned. We are informed that there will be a Centenary Service, followed by a reception and an address by the Dean of the Faculty; there will also be a centenary dinner staged on an appropriate scale.

Two of the Largest Bakeries in Lanarkshire are being converted from solid fuel firing to gas. As an initial installation, 12 ovens are being built at the present time. The ovens are each 12 ft. 6 in. by 8 ft. 6 in. and are of the front fired draw-plate type with water tubes, &c. They are thermostatically controlled to maintain a maximum temperature of 500° F. The size of the fire box is 24 in. by 20 in., and the maximum consumption per oven is 900 cu.ft. per hour. The ovens are being built by Melvin & Gillespie, Ltd., Glasgow. In addition to the gas fired ovens, the two bakeries are installing new 12 ft. gas hotplates, with a gas consumption of 900 cu.ft. per hour for each hotplate.

Members of the Sheffield Women's Voluntary Service Food Leaders met recently in the Sheffield and District Gas Company's cinema for a 75-minute film show, comprising " A Start in Life " (a film on infant and child welfare), " Food Manufacture " (modern and hygienic methods of food production and packing), " The Manufacture of Gas " (British Gas Council film), and " Musical " (from the Sheffield and District Gas Company's library). Mrs. Pearson, Women's Voluntary Service Organizer, expressed thanks to the General Manager of the Sheffield and District Gas Company, and said " The Manufacture of Gas " had given them an insight into the magnitude of the processes associated with gas manufacture and the thousands of by-products derived from coal.

Members of the Institutional Management Association were entertained recently by the Cambridge University and Town Gas Light Company. The Association includes women who are engaged in various branches of domestic administration, and among its functions is the promotion of the appointment of qualified women to posts of responsibility in domestic administration, the provision of general information on household and institutional equipment and supplies, and the organization of groups in different geographical areas. Under the guidance of the Company, the guests made an inspection of the kitchens at Jesus College and King's College, both of which are fully gas-equipped. Tea was served in the Gas Company's Demonstration Theatre, following which questions were invited and discussion encouraged. Among the subjects dealt with were the raising of steam by gas heating; the use of drying cabinets in kitchens; and central heating by gas. The Steward of Newnham College, Mrs. M. F. McFie, presided, and proposed a vote of thanks to the Gas Company for its co-operation and hospitality.

A Show of Scottish Made Goods on the basis of the Britain Can Make It Exhibition has been announced for Edinburgh in August-September at a time when the city will be filled with tourists attending the International Festival of Music and Drama. There will be special groups for domestic and kitchen appliances and equipment, in a wide range of classifications. Unique feature of the exhibition, which will be held in the Royal Scottish Museum, will be the fact that all the shops in Princes Street have agreed to put their window space at the disposal of the organizers and thus extend the actual exhibition of Scottish goods over a mile of outdoor space. The official title of the exhibition is " Enterprise—Scotland, 1947 " and it is sponsored by the C.O.I.D., Financed by the Treasury, and has the blessing of the Board of Trade. Mr. Basil Spence, A.R.I.B.A., F.R.I.A.S., and Mr. James Gardner, O.B.E., who were Chief Architect and Chief Designer respectively at the Britain Can Make It Exhibition, are to hold similar positions at this event. The event will not be a trade fair and no selling will be permitted, although a catalogue will be issued and trade contact encouraged.

The Application List for the issue of £138,888 Consolidated stock carrying a maximum dividend of 5% at £108 per £100 of stock in the Northampton Gaslight Company closed five minutes after opening, the issue having been oversubscribed. The proceeds of the issue are required mainly to meet the cost of extensions to plant and mains.

The Spring Meeting of the North British Association of Gas Managers will be held at Paisley on Apr. 11. Following a civic welcome at the Town Hall at 10.30 a.m. and the routine business, Mr. J. M. Dow will deliver his Presidential Address. A golf competition for the Winson Scott Cup will be played on the Kilmacolm Course on Apr. 10.

Coventry Link with Rugby

A 25 years' agreement is to be entered into between the Coventry Gas Department and the Rugby Gas Company whereby Coventry will supply Rugby with a minimum of 360,000 cu.ft. per day during the six summer months, and 720,000 cu.ft. per day during the six winter months in each year. This will represent a minimum of 200 million cu.ft. per annum. Rugby lies due east of Coventry, and the two statutory areas of supply adjoin. The total length of the proposed 10 in. high pressure main is approximately 10½ miles, and the gas will be metered and governed on the joint boundary of the two undertakings, which lies approximately midway along the route of the new main. The approximate cost of the total scheme is £64,000 and each undertaking will bear the cost of such portion of the main as comes within its area of supply. Application will be made to the Ministry of Fuel and Power for sanction of a loan of £32,000.

It is of interest to note that the recent agreement entered into with the Birmingham Gas Department for a bulk supply of gas from Coventry is based on similar lines, and in that instance the minimum annual quantity of gas was 500 million cu.ft.

Apart from the urgent need for this gas in Rugby during the coming winter, there is also considerable scope for additional load in Brandon and Wolston, and in other portions of the statutory area of supply not yet fully served.

Diary

Apr. 10.—Institution of Chemical Engineers: 25th Annual Corporate Meeting, Connaught Rooms, 11 a.m. Luncheon. 1 p.m.

Apr. 11.—North British Association of Gas Managers: Spring Meeting, Town Hall, Paisley, 10.30 a.m.

Apr. 14.—London and Counties Coke Association : Technical Committee, 2.30 p.m Gas Industry House

Apr. 15.—National Federation of Gas Coke Associations: General Committee, 10 a.m.; National Technical Committee, 11.30 a.m. Gas Industry House.

Apr. 15.—Solid Smokeless Fuels Federation: Technical Committee, Gas Industry House, 2.45 p.m.

Apr. 15.—British Gas Council : Central Board. Gas Industry House, 2.30 p.m.

Apr. 15.—Midland Junior Gas Association: " Distribution, Mainlaying, Servicing and Design of Distribution Systems," A. G. Addison (Birmingham).

Apr. 17.—Yorkshire Junior Gas Association: Visit to Derbyshire Silica and Fireclay Co., Ltd., Friden.

Apr. 19.—London and Southern District Junior Gas Association: Visit to High Wycombe Works of the Uxbridge, Maidenhead, Wycombe, and District Gas Company.

Apr. 19.—Manchester and District Junior Gas Association: Visit to Stockport Gas-works. Paper: " The Production of 53% Sulphur Spent Oxide," J. Gaskarth (Liverpool).

Apr. 21.—London and Counties Coke Association. Finance Committee, 11 a.m. Executive Committee, 11.30 a.m. Central Committee, 1.30 p.m. Gas Industry House.

Apr. 24.—Industrial Gas Development Committee, Manchester, 10 a.m.

Apr. 25.—London and Southern District Junior Gas Association: " The Woman's Point of View," Miss Maywen Godby. Gas Industry House, 7 p.m.

Apr. 29.—Midland Junior Gas Association: Annual General Meeting, followed by Address, " New Methods and Materials for House Construction," A. G. Day (Building Research Station).

Apr. 29.—Southern Association of Gas Engineers and Managers (Eastern District): " Mechanized Accountancy and Statistical Work as Applied to a Gas Company," J. D. Thomas (North Middlesex Gas Company). Gas Industry House, 2.30 p.m.

May 1.—Solid Smokeless Fuels Federation: Executive Committee Dorchester Hotel, Park Lane, 11.30 a.m.

May 9.—Manchester District Association of Gas Engineers: Annual Meeting and Luncheon, Midland Hotel, Manchester,

Practical Experiences in the Coking of Dangerous Low-Ash Coals*

By D. T. BARRITT

(A "Gas Journal" Abstract)

IN Great Britain 20 million tons of coal is carbonized per annum in coke ovens located in 88 plants comprising about 4,800 ovens of various designs, capacities, and ages. The greater part of the coke produced is used in blast furnaces for the reduction of iron ore, but several plants make coke for the domestic market from the more weakly coking coals and one important installation provides coke for the production of water gas in the manufacture of synthetic sulphate of ammonia.

Many of the plants built 30 or more years ago are still extant. They were built in fireclay, chamber dimensions were small and throughput of coal per oven lay between six and seven tons per day. The use of silica refractories since 1921 has enabled ovens to be built 45 ft. long, 14 to 15 ft. high, and 16 to 18 in. wide with a daily throughput of 24 tons. All modern ovens are of the regenerative type leaving 60% of the gas made available for sale after the heating requirements of the process have been met. Combined with steelworks plant, if the ovens are fired by blast furnace gas, the coke oven gas is used to heat the steel furnaces, and the balance can be so arranged that the whole heat requirements of the works are met without need for any other fuel than the coal charged to the coke ovens. Regenerative ovens, not combined with steelworks, supplied 52,000 million cu. ft. of town gas in 1945.

British coke oven installations vary from the smallest plant of 15 ovens carbonizing 200 tons of coal per day to the largest with 136 ovens with a daily throughput of 3,000 tons and a potential surplus of 35 million cu. ft. of gas. They are built in batteries containing up to 60 ovens. Two methods of charging are used: Top charging through four or more openings in the roof of the oven, the top of the charge being mechanically levelled, leaving a free space of 12 in. above the charge; and compressed or cake charging in which the charge, mechanically stamped into a steel cake box, is introduced through the ram side opening of the oven in the form of a compressed cake about 1½ in. less in width than the oven. The bottom plate of the cake box, known as the "peel," is power-driven (by the discharging machine) into the oven, carrying the charge with it. A stop is placed against the back end of the charge while the peel is withdrawn, leaving the charge behind in place. The essential difference between the two methods is that, whereas with top-charging the density of the charge rarely exceeds 48 lb./cu.ft., compressed charges normally lie between 60 and 70 lb./cu.ft. The latter method is cumbersome and slow and is only used where weakly coking coals make it necessary, never for strongly coking coals unless special coke of high density is required.

Dangerously swelling coals are those capable of developing sufficient pressure on coking to damage or distort coke oven walls. They are found in the low volatile ranges, between 17 to 23% volatiles on the dry ash-free basis. Failure to recognize a dangerously swelling coal before charging may involve distortion and serious damage, often by the first charge, to the whole battery of ovens since all will have been charged before the first is discharged, revealing the damage.

Experiences with a Modern Coking Plant

The object of the present Paper is to describe experiences with a modern coking plant designed in 1938 to produce high-density coke from compressed charges of a strongly coking coal, from the Kilsyth Coking Seam, to relate oven damage to variations in volatile matter and other factors, to adapt the Koppers laboratory swelling test to the recognition of the danger point of this particular coal, to determine the effect of breeze blending, and to give recommendations for the design of compressed charge coke ovens.

The nature, recognition and coking of swelling coals is discussed. "All coking coals must swell during the plastic stage, but they exert a dangerous pressure on the oven walls only if the swelling in the plastic layers exceeds the shrinkage in the semi-coke. It is important to realize that it is not high swelling power alone, but high swelling power combined with low shrinkage which is the cause of damage to oven walls."

The Koppers laboratory test is generally used in this country for the recognition of dangerous coals. It is an empirical test and requires standardization against the actual behaviour of a large number of coals in coke ovens. Typical Koppers expansion curves are given showing dangerous, border line, and safe coal at normal densities. Tentative rules of interpretation applicable to top charging are given—(1) that the curve shall not rise above zero expansion in any part; (2) that the final contraction shall not be less than 8%, and (3) that it is desirable that contraction should be indicated by the curve falling rapidly early in the test, "and not hang up." The application of the test to compressed charging is much less certain.

Precautions recommended in coking dangerous coals in top-charged ovens are, in design the use of ovens of height not more than 12 ft. 6 in. with thicker walls both of the oven and the battery, in preparation blending with a non-swelling coal to show a contraction on the Koppers test of not less than 10%, and in operation the use of moderate temperatures and leaving the charge in the oven for about an hour after coking is complete to obtain the full effect of shrinkage. These methods may not be effective with compressed-charging in which "recourse can only be had to blending with a higher proportion of shrinking coals."

The design of the new plant was influenced by the demand for electrodes for aluminium furnaces, which until recent years had been made from coke obtained from the carbonization of pitch or petroleum residues. The following requirements were laid down:—

(a) The coke must have an ash content not exceeding 1.5%;
(b) the bulk density must not be less than 28 lb./cu.ft. measured on ¼ in. coke and below, with ¼ in. material screened out;
(c) volatile matter must not exceed 1%.

The coal selected was that of the Kilsyth Coking Seam, mined at Gartshore No. 11 Colliery in the Central Coalfield of Scotland. It yielded two fractions on flotation, one with ash content about 1%, the other with 4 to 6%. The former was to serve for the production of low-ash coke, the latter for a foundry coke, the coal substance in each case being the same. An analysis of the two fractions, made in 1938, showed volatile matter 28.65% in the low-ash fraction, 26.35% in the foundry fraction, agglutinating value 23 and 20 respectively.

Compressed Charging

These coals had been carbonized for a limited time before 1938 in a battery of compressed-charged Semet Solvay ovens, more than 40 years old, about 32 ft. long, 6 ft. 6 in. high and 16 in. parallel width. The requisite density for the low-ash coke could only be reached by compressed-charging, top-charging yielding a coke 25 lb./cu.ft. or less. A test in a modern plant confirmed that the specified density could only be reached by compressed-charging.

The new ovens were built about 36 ft. long, 11 ft. high, and 19 in. wide parallel. The charge was to be 35 ft. 9¾ in. long, 10 ft. 6 in. high and 17½ in. wide. There are 30 ovens in all built in two independent blocks, seven ovens for the low-ash coke and 23 for the foundry coke, divided by a middle buttress. The low-ash charge was 15.9 tons of coal carbonized in 24 hours and the foundry charge 12.4 tons in 31 hours. The design was based on a battery at Gluckshilf in Lower Silesia. The data taken on this plant showed that there were no mechanical difficulties in compressing and carbonizing a charge of the size proposed for the Scottish plant, but several questions remained unanswered:—

(i) Would compressed charges, hitherto used with weakly-coking coals, result in the strongly-coking coal becoming dangerously swelling at the high densities required to form a stable charge and was the arbitrary figure of 24 hours reasonable in a 19 in. wide oven with this particular coal?
(ii) The compressed charge was to contain 20% of free water and to be sized with 98% below 1 mm. Experience had shown that these factors were critical and indicated that free water should be between 9 and 12% and that coal below ¼ in. should lie between 50 and 70% of the charge. Small compressed charges had been successful in the old Semet-Solvay ovens; would a charge of much greater dimensions be equally successful?
(iii) Would the high water content ruin the refractory materials?

Nothing could be done in the design to guard against difficulties under (i) and (ii), but against (iii) the oven walls were built in semi-silica (80% SiO_2) instead of 95% silica, but it was considered that the difficulties would not be insurmountable and the plant was put in hand to the dimensions specified.

* Paper to the Yorshire Section of the Institute of Fuel.

The first compressed charge was put in on Jan. 17, 1941, and within three days all the ovens were at work, seven on the low-ash coal, about half the battery of 23 ovens on the foundry coal, and the balance on Haughrigg coal, which proved to be highly contracting and gave no trouble. It was obvious from the start that, though both the foundry and low-ash ovens were discharging satisfactorily, the coke was tight in the oven and the working margin was small. In ten days "stickers" began to occur and soon became too frequent. The size of the charge was reduced and the lighest possible stamping consistent with a stable cake was adopted and the cake box was strengthened to eliminate the observed bulging. These measures were not wholly successful and further reductions were made in the width and density of the cake. Stickers continuing and damage of oven walls growing it was decided to change over to top charging and to make further experiments both on the old and the new plant to ascertain the critical values of the several factors. These experiments are described at length and the following are some of the conclusions reached. This particular coal became dangerously swelling when compressed-charged at a density of 65 lb./cu.ft., when the volatile matter on the dry ash-free basis fell below 26.8% in the new oven 19 in. wide with charges 14½ in. wide, and in the old ovens 16 in. wide with charges 15 in. wide. A bulk density in the low-ash coke at 28 lb./cu.ft. could not be achieved by compressed-charging unless the volatile matter exceeded 26.8% and with top charging it could not appreciably exceed 26 lb./cu.ft. Breeze blending and the addition of water were not successful in reaching the required density. Low-ash coal is dangerously swelling when compressed-charged, when the Koppers test (under conditions given) shows a maximum expansion of over 1% or a final contraction of less than 5.7%.

Damage to the oven walls of the new plant and methods of repair are described. Eighteen of the ovens were rebuilt to the original parallel dimensions, but the remainder were converted to taper ovens, 18 to 20 in. Stickers were common to both, but once the charge was on the move in the tapered ovens it rarely jammed.

The Paper concludes with recommendations for the design of compressed-charge ovens. It is essential to carry out Koppers tests on the coal to ascertain at what density the coal reaches dangerous expanding limits. The height to breadth ratio will then be selected to form a stable cake at a density well below the critical point.

In a table given in the Paper it is shown that, for example, with a critical density of 70 lb./cu.ft., 65 would be allowed with a height to breadth ratio of 6:1. With high volatile (32% plus) coals parallel ovens are suitable, the charge being 1½ in. less in width than the oven. With lower-volatiles showing a small shrinkage, a tapered oven and tapered charge are necessary with the same margin. It is strongly recommended that top-charging equipment with four holes, one as near as possible to each end, should be provided to deal with broken charges. The battery should be started up on top charging, compressed charging being introduced gradually as working temperatures are reached. Special attention should be paid to the strength of the caking box to obviate distortion of the sides. When dealing with coal of varying properties the dimensions of the caking box should be capable of variation to sujt. With semi-silica ovens a flue temperature of 1,150°C. should not be exceeded. With this temperature and coals similar to the Kilsyth coals referred to in the Paper, coking times of 26 hours for top charging and 31 hours for compressed charges are the minimum for 19 in. ovens.

Before and After Nationalization

By ARBITER

In his previous article the Author surveyed the existing commercial and financial structure of the Gas Industry under private enterprise. Here he seeks—in vain—an answer to the question as to what is to be gained by anybody as a result of nationalization.

HAVING set out in the previous article the present position under private enterprise one is led to ask—Why nationalization? When a fundamental change is threatened the question arises, where is the need, and where, and how, and in what manner, are additional advantages and benefits to the employee and consumer to be obtained?

Are there any additional benefits or advantages for: (1) Consumer interests, as to price, protection and quality? (2) Employees, as to conditions and welfare. (3) Shareholders, as to justice or may be part confiscation?

It is fair to ask that the Government, through the appropriate Ministers and Departments, should state them unequivocally. Is nationalization a doctrinaire and avowed political policy regardless of aught else?

If nationalization is to be thrust upon the nation willy nilly without universal benefit to all affected then it is necessary to examine what basis of compensation is proposed. At the moment it is at best disclosed by the famous phrase (or should it be described by another word!) "Lock—stock—and barrel."

An Industry created by private enterprise and functioning in some cases for 100 years under Parliamentary control with periodical revisions, which has done exceedingly well, and maintained its supply within the limits and control of Parliament, deserves generous treatment. Let us examine the conditions which exist at a time when the Government has decided to evaluate the Industry in order to assess the basis of acquiring the property to be transferred.

Since 1938 the price of coal has increased by 100%, that is, from round about 27s. per ton to 54s. per ton, and in some cases more. The Government acknowledges that in order to maintain supplies during the crisis period coal suitable only for domestic use has been diverted for use in gas plant. Users of gas during the crisis can find an answer as to whether the supply has been reasonably maintained having regard to all the difficulties.

The quality of coal supplied under Government control has vastly deteriorated and as a consequence has resulted in smaller outputs per ton of coal carbonized. Coke has also been adversely affected. Mr. J. P. Dickie, M.P. for Consett, 1931-1936, wrote in the *Daily Telegraph* of Feb. 28, under the heading "Millions of tons of 'Coal' that are worse than Useless":

"The more serious aspects of this problem are the deterioration of the quality of coal supplied to industry and public utility undertakings and the lack of any definite information as to the extent of the evil. The industrial consumer suffers more from a decline in quality than the domestic consumer. He relies on receiving fuel of a certain calorific value and when he is supplied with coal containing a high percentage of ash, stone, shale, slate, and dirt he is paying for something which is not only valueless, but is a positive hindrance to the fuel efficiency of his plant."

Wages, local rates and costs generally have increased enormously. Is, therefore, a Stock Exchange valuation a fair or proper basis for valuation?

Stock Exchange Values

The Stock Exchange quotation is based from time to time on the rate of dividend actually paid, taking no heed of the latent possibilities of any particular company being able under normal conditions to earn and pay a higher dividend.

The real value of any undertaking under conditions now existing is not found by reference to Stock Exchange prices, the more so when nationalization is threatened. An arbitrator would examine the position of each company in detail, regard being given to whether the undertaking had been bled white by extracting dividends or carried on for the continued benefit to consumer, employee, and shareholder on fair and just lines. Thus, and thus only, can an arbitrator ascertain what is recognized as maintainable profits.

The Government has recognized by the passing of the Gas Regulation Act, 1920, and the Gas Undertakings Act, 1929, the justice of adjusting and controlling prices for ascertaining the basis of earnings. Under the provisions of the Act of 1920, the Board of Trade had power to adjust the standard or maximum price . . . "with such additions as appears to the Board reasonably required in order to meet the increases (if any) due to circumstances beyond the control of, or which could not reasonably be avoided by the undertakers, since June 30, 1914." (Sec. 8 and Schedule.)

Then again the 1929 Act provides that—"If at any time it appears to the Board of Trade, in relation to any undertakers, that there has since June 30, 1914, been any increase or decrease in—

"(*a*) the rate of interest which the undertakers are obliged to pay on capital raised or money borrowed for the purpose of their undertaking; or

"(*b*) the cost of providing works, plant, or apparatus for the supply of gas; or

"(*c*) the annual output of their gas undertaking; or

"(*d*) the efficiency with which that undertaking has been carried on;

the Board may make an amending Order under this section revising

the powers of charging authorized by the original Order with respect to the undertakers, in such manner as to *secure* that they are not prejudiced by any such increase or benefited by any such decrease."

All appeals to the Board of Trade during the late war under these Acts have been suspended.

Do Stock Exchange prices and quotations reflect the true and real value of gas stocks to-day?

Gas companies should be allowed to invoke the law relating to adjustment of charging before purchase becomes effective. Stock Exchange values would quickly respond. Some Stock Exchange values of Ordinary stocks in 1937 compared with 1946 are given herewith.

The effect of war and the shadow of nationalization is reflected in "low" Stock Exchange values at the end of 1946.

The present Minister of Fuel and Power has stated that if the Gas Industry could put forward an alternative to nationalization he would be pleased to consider it. His attention is drawn to the

(1) Report of the National Fuel and Power Committee, 1926.
(2) Report of the Departmental Committee or Area Gas Supply, 1930.
(3) Gas Legislation Committee Reports, 1932.
(4) Heyworth Committee Report, 1945.
(5) British Gas Federation Report to the Ministry, 1943.
(6) Gas Protection Companies Association Report to the Ministry.
(7) Report of the Association of Municipal Corporations, 1944.

The French Government has decided not to go forward with nationalizing public utility undertakings. The British Government might be asked in all fairness to pause and ponder on all these facts.

COMPARATIVE STOCK EXCHANGE VALUES.

	Pre-war (1937) Price	Pre-war (1937) Dividend %	Stock Exchange values 1946 High	Stock Exchange values 1946 Low
Gas Light and Coke (£1) ...	27s. 1¼d.	5⅝	24s.	20s.
South Metropolitan (£100) ...	120¼	5¼	101½	£88
Wandsworth (£100)	163	7	111	106
Croydon (£100)	152	7	125	116
Tottenham (£100)	155¼	6¾	112	105
Liverpool (£100)	£138	6	116	108
Newcastle (£1)	26s. 9d.	5¾	25s. 6d.	22s. 4½d.
Cardiff (£100)	£134	6	126	120
South Eastern Gas Corporation (£1)	28s. 1½d.	6	22s. 3d.	19s. 6d.
South Suburban (£100) ...	£134	6	111	104½

The Gas Industry *vis à vis* the Coke Oven Industry

[From a Special Correspondent]

(*Continued from p. 627*)

Tar Fog Extraction

In both gas-works and coke oven practice there is a considerable extraction of tar fog from the crude gas at an early stage. In systems where the crude gas is sprayed with liquor in ascension pipes and collecting mains, possibly up to three-quarters of the original tar in the gas is precipitated by the liquor spray. There is subsequent removal of fog in the gas mains and coolers, but it is important that there be efficient tar extraction finally so that the efficiency of the ammonia and hydrogen sulphide recovery processes are not impaired.

Until comparatively recent times the standard units on gas-works for the removal of tar fog were the Livesey washer and impingement types of apparatus such as the P. & A. extractor. These were used either alone or in combination with each other. The Livesey washer has only a moderate efficiency—possibly not much more than 50%—and throws a considerable back pressure, but it has been popular because it can also perform the function of the first gas stage in the ammonia washing process. The P. & A. extractor throws about the same back pressure as the Livesey washer and although somewhat more efficient it requires more frequent cleaning. Many gas-works still use Livesey washers and P. & A. tar extractors for the removal of tar fog, but place reliance on the oxide boxes for its final removal.

Little use is made of units of the above types for the removal of tar fog from coke oven gas. Fairly complete removal is generally obtained in turbo exhausters and at some coke ovens the use of units for the removal of tar fog has been dispensed with because of the comparatively high efficiency of removal by high speed exhausters. Reporting on some tests carried out on the value of high speed turbo-exhausters for the removal of tar fog from carburetted water gas and from coal gas, E. H. M. Badger[14] states that the removal is almost confined to the first stage of multi-stage machines. Consequently, single stage exhausters, which operate at higher speeds than multi-stage exhausters, will provide a greater degree of tar fog removal. The residual tar fog in a coal gas cooled in primary condensers was less than 20 grains per 100 cu.ft. at the outlet of a two stage machine.

Almost complete removal of the residual fog in gas is achieved by electrostatic precipitators, and these units found favour in the Coke Oven Industry at an early stage of their development. The Gas Industry was at first less inclined to adopt them, but they are now well established in gas-works practice. It may therefore be said that electrostatic tar extractors are standard equipment on both gas-works and coke oven plants. Any difference in technique may lie in the provision of a Livesey washer in gas-works practice, operating in series with an electro-detarrer in order to act as a safeguard in case the latter breaks down. Where reserve electro-detarrer capacity can be provided this is unnecessary.

Ammonia Recovery

Three systems for the recovery of ammonia from coal gas have been developed—namely, the direct, the semi-direct, and the indirect. In the first of these hot untreated gas is contacted with sulphuric acid of a suitable strength at a temperature of about 110°C. in lead-lined vessels (saturators). Sulphate of ammonia thus directly produced is removed from the acid bath at certain intervals. In the second system the gas is first passed through primary coolers. After exhausting it is then reheated to between 40° and 60°C. before passing through a sulphuric acid solution in the saturator. The virgin liquor produced at the coolers and excess liquor from the catch tank are distilled and the ammonia evolved is also passed with the gas through the saturator, but on some plants the liquor from the coolers is used as "make-up" for the oven sprays. As with the direct system, the sulphate crystals separating out in the acid bath are removed at predetermined intervals.

The temperatures maintained in these systems of ammonia recovery are determined by the necessity to avoid absorption of moisture from the gas by the acid. Thus the acid can be maintained at a suitable concentration for sulphate crystal growth.

In the indirect system the ammonia in the gas is absorbed as liquor, which at a later date can be worked up and converted to sulphate in separate plant. Thus there can be little or no absorption of H_2S, HCN, &c., from gas passed through the saturators of the direct and semi-direct systems because of the conditions prevailing in them. In the indirect system there is ample opportunity for these impurities to be partially absorbed by the liquor.

On gas-works the predominant method for the recovery of ammonia is the indirect system, there being only one instance of a plant of the other types. The older gas-works practice has been to use tower scrubbers. These are now being superseded by static washers or by rotary washers, both of which are considerably more efficient in contacting large quantities of gas with small amounts of liquid and so producing the maximum strength of liquor. Static washers are in effect a multiplicity of small tower scrubbers in series with rapid recirculation of the washing medium round each bay, and units can be built to deal with 20 million cu.ft., or over, of gas per day.

A tendency in recent years in the Gas Industry has been to produce from the recovered ammonia liquor a concentrated liquor up to 22% strength. Considerable savings in the cost of transport of ammonia to central sulphate plants can thus be achieved.

On coke oven plants the outstanding feature of present-day practice is the predominance of the semi-direct method of recovery. Both the direct and semi-direct methods have been perfected, more especially the latter, there being considerable incentives to do so in view of the savings in cost which can be achieved, especially in regard to water evaporation. Moreover, there is a greater simplicity in the sum total of plant required for the production of sulphate of ammonia. It has been stated[15] that the relative costs of making sulphate by the direct, semi-direct and indirect methods are in the ratio of 1.0 : 1.1 : 1.3.

The present-day technique employed for the production of sulphate on coke oven plants has been evolved largely because these plants are designed for a steady output of coke and, incidentally, of gas. The saturator only works well at its rated capacity and therefore its operation would be much more difficult on gas-works where the daily load was variable and the winter load was about twice that of the summer. The sulphate plant also requires the full-time attention of two men per shift. Therefore there is a minimum size of unit which can justify this cost for labour, and the majority of gas-works are below this size even at their maximum output. As saturators are frequently worked on gas which has not been thoroughly cleaned of tar fog—in the direct system all tar fog is present—saturators are liable to breakdown and in any event require cleaning at regular intervals. On this account complete stand-by units are necessary. The back pressure thrown by a saturator is high, being about 10 to 16 in. water gauge, and varies in two ways. In the first place changes occur according to

[14] E. H. M. Badger, J.S.C.I., 1946, **65**, 166.

[15] Glind-Myers. "International Handbook of By-Product Coking Industry."

the state of the absorption bath. There are also rapid pulsations due to the bubbling which takes place, and when turbo-exhausters are used these pulsations can be felt a considerable way back in the gas collecting system.

Finally, the passage of gas through sulphuric acid solution in finely divided streams means that there is no slip of ammonia through the saturator. On plants where it is not necessary to remove hydrogen sulphide subsequently this point is of no importance and may be an advantage in that a possible cause of sludge formation of the wash oils in benzole plants is avoided. Where hydrogen sulphide removal is practised the appropriate amount of ammonia in the gas required to operate the process efficiently can be obtained by suitable by-pass arrangements at the saturator, but this is an added complication.

(To be continued)

Low Ash Coal in Carbonization

[From a Special Correspondent]

This article, which had to be held over from our issue last week, was the subject of editorial comment in that issue (p. 607).

THE question of utilizing low ash coal in the carbonizing industry has again attracted the attention of the gas engineer. The reason for this is not difficult to understand, since gas coke—as at present produced—is difficult to ignite and moreover, will not sustain combustion, owing to its high ash content and low percentage of volatile hydrocarbons, plus defective cell structure.

Coal used for the production of "Coalite" does not contain more than 3½ to 4% of ash, and yields a "smokeless fuel" containing no more than 6% of ash. Coalite has a low ignition temperature and is very reactive (180) compared with high temperature gas coke (135) made from a high ash coal carbonized at a temperature of from 1,000°C. to 1,200°C. in the retort, plus steaming up to 30%. Apart from the quality of high temperature coke, the size of the fuel has an important bearing upon its combustion properties when used in the ordinary domestic grate, which is intended to burn only house coal of good quality.

While recognizing that a great deal of academic attention has been given to gas coke by many scientists and gas engineers, large scale tests have been conspicuous by their absence. The matter of *initial cost of coal* for carbonization has nearly always ruled in this country, and very few gas concerns have given a lengthy trial of low ash coal of the best quality. The poor quality of gas coke has in the past given it a bad name, and it will take a long time to convert the housewife to a different opinion. Gas pokers have certainly gained some popularity as to ignition troubles, since paper and wood are no longer necessary, but the ash running to 20-30% does nothing to boost the sale of gas coke. The sizing of coke has also received some attention by several concerns, but the size has to bear a close relation to quality, otherwise failure is definite. Special grates for burning gas coke have certainly improved matters, but they form a very small percentage of the total number of grates in use in Great Britain.

Coal Washing

With reference to coal washing at the collieries, the following will roughly indicate the quantity and percentage yield of dried washed slack sent to the carbonizing plant (coke ovens), also the quantity and percentage of dry nuts, beans and peas sold after washing.

The raw coal delivered to the washery (120 tons per hour) was through 2½ in.

TABLE I

South Yorkshire 2½-0 in., 15 different varieties.

Weight of coal to washery per month	Dried washed slack to ovens	Dry nuts sold, three sizes	Dry shales to tip	Fines dust to ovens	Moisture in coal raw
Tons	Tons	Tons	Tons	Tons	Tons
23,324	14,926	3,787	2,471	980	1,165
100%	64%	16.20	10.6%	4.2%	5.0%

The 2½ in. slack from the collieries is de-dusted and the fines added to the washed coking slack. The de-dusted coal is screened to ½ in., oversize going to the nut washers. The oversize is washed and after screening to peas (½-¾ in.), nuts ¾-1½ in., first nuts 1½-2½ in., these are rewashed before going to the drainage-storage bunkers. The "schlam" or fine coal from the washery goes to large settling tanks (spitzkasten) and after settlement is vacuum extracted, and then used for firing the boilers, in admixture with breeze and surplus gas. The washed slack before going to the coking plant, is drained for 24 hours in very large drainage bunkers, the "table extracted" crushed and elevated to a 600-ton storage bunker and again drained. The drained coal is then stamped and charged into the ovens, in the form of a cake, of about 7 tons in weight. Topping is effected by a special machine through apertures in the oven tops, and levelled off by the usual leveller. By stamping the coal before charging the bulk density is increased, and a full oven gives a better yield of by-products, especially benzole. The moisture in the coal as charged is around 12%, which is the correct amount for yielding a silvery coke suited for blast-furnaces. About 280 tons per diem of this coke is cut by circular saw, screened and sold for domestic purposes. Special attention is paid to the sizing of the "smokeless fuel" to suit the requirements of customers.

With reference to the present annual consumption of coal for gas manufacture, stated to be 23,700,000 tons in 1945, by the Minister for Fuel and Mines, the coke for sale based on 8 cwt. per ton of coal would be approximately 9,500,000 tons exclusive of breeze. The quantity of coke used in manufacture of C.W.G. based on the gas oil consumption at 93,000,000 gall. would be about 794,000 tons, or 5.15% of the total make of coke, viz.: 15,400,000 tons. The breeze made would be approximately 1,327,200 tons, or 8.6%. The coke used as fuel would be about 2,700,000 tons; the balance goes for "in situ" B.W.G. due to steaming, and fuel for works boilers.

Ash in Coal

The average quantity of ash in unwashed coal to-day is equal to about 18% at least, and if washed to 4% one has 14% of detritus removed, and this, on 23,700,000 tons of coal, is equivalent to 3,320,000 tons and reduces the coal required to 20,380,000 tons for the same gas production. The freight cost (average) would not be less than 6s. per ton; therefore we have a saving of something in the order of £1,000,000 (£996,000) per annum by leaving the ash at the collieries. One has less coal to purchase at, say, 50s. per ton, or a total of £8,300,000 per annum, which would enable 8.15 shillings to be paid per ton towards the coal washing and freight, on 20,380,000 tons in place of 23,700,000 tons. The cost of washing plus ash disposal at the colliery may be taken at 2s. 6d. per ton for washing and 1s. per ton for ash disposal by ropeway, making an added cost of 3s. 6d. per ton for 4% ash-coal. The collieries lose the sale of 14% of ash at 40s. per ton and therefore must make it up to 45s. 6d. per ton, or 1.14 tons at 40s., *i.e.*, 45s. 6d. To this must be added the cost of washing and ash disposal at 3s. 6d. per ton, making a total of 49s. 7d., say 50s. per ton at pithead. Adding 6s. for freight (average) we have £2 16s. per ton delivered for 4% ash coal. The cost per ton of coal will vary with the distance of the consuming plant from the pits, and seaborne coal Goole-London will be below 6s. per ton, in company-owned ships.

Yield of Gas from 4% Ash-Coal

With regard to the yield of gas in therms per ton, there can be little doubt that it is considerably improved, quite apart from de-ashing of the coal. As to speed of carboniza-

tion, this is indisputable and will be found correct if tried out on a large scale.

Adverting to coal size in relation to decrease in carbonizing time, the writer has tested this many times in a 32 ton/day vertical retort plant, operating at various temperatures from 600-1200°C. The size used was double screened nuts through ¾ in. and on ½ in., using "Haigh Moor" coal, S. Yorks. The carbonizing time was reduced from 8 hours to 6 hours on 1 ton charges. The nuts contained slightly less than 4% ash. The temperature on test was 700-800°C. Although this was a low temperature test, it gave useful data and at higher temperatures would undoubtedly show considerable saving in carbonizing time.

The plastic stage is less impermeable owing to the absence of excessive ash, which does have a deleterious effect.

Mr. P. C. Gardiner, of the Tottenham and District Gas Company, is moving in the right direction with regard to the utilization of low ash coal—the lower the better. The writer, when out in the East, used a coal from New South Wales which did not contain more than 2% of ash.

The coke from this coal was used mainly for the gas producers heating the settings. The coke was discharged hot direct into the producers with the result that clinkering of the furnaces took place *once a year*, and the coke consumption rarely exceeded 10%. The surplus coke was mixed with the coke from Indian coal (Sanctoria No. 9) which was a low rank coal 18% V.M.). The coke had a good sale and stocks were a thing unknown. The C.V. of the gas was 400 B.Th.U./cu.ft. and sold on a 10-year contract to the municipality for street lighting. Some 2,700 street lamps had to have a guaranteed I.P. of 60 per single burner. Testing per portable photometer was carried out by the city's assistant engineer.

The use of low ash coal means low ash coke, and 4% ash in coal means 6% ash in coke, whereas the coke the writer is now using for water heating contains anything from 30-40% ash. The "crazy paving" mentioned by one writer on the subject of ashy coal vended to-day at £4 per ton was by no means exaggerating—in fact, one could have paved a number of garden paths with the bats removed from the fire-grates in my own residence during the past 6 years.

Coal Output

In the annual returns of the Ministry of Mines under Government control, nothing is said about the *uncontrolled* 17 million tons of ash brought to bank—in *excess* of pre-war ash content.

With a view to obtaining a rough idea of the advantages which would accrue by reason of using a low ash coal (4%) for carbonizing in the most suitable type of plant, the following figures may be of some service:

Estimated Improvements in Gas and Residuals Yield

	Therms	Steam
1 ton coal with 18% ash	68	15%
1 ton coal with 8% ash	76	22%
1 ton coal with 4% ash	82	30%

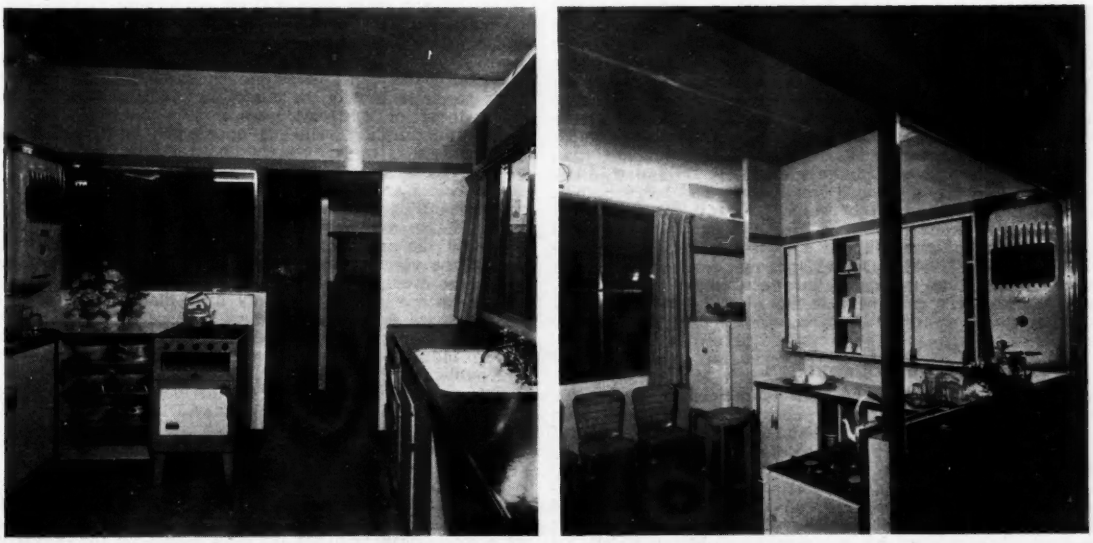
1 ton coal with 18% ash, coke for sale	8.0 cwt.
1 ton coal with 8% ash, coke for sale	9.5 cwt.
1 ton coal with 4% ash, coke for sale	10.3 cwt.
1 ton coal with 18% ash, tar for sale	12.5 gall.
1 ton coal with 8% ash, tar for sale	16.0 gall
1 ton coal with 4% ash, tar for sale	18.0 gall
Make per ton, 18% ash, 450 C.V.	15,110 cu.ft.
Make per ton, 8% ash, 450 C.V.	16,880 cu.ft.
Make per ton, 4% ash, 450 C.V.	18,220 cu.ft.

The improvement in yield of gas is due to the fact that one does not get gas from coal ash, beyond a few cu.ft. of CO_2 from the Ca CO_3 in the ash. With regard to coke yield, the amount of coke used in the gas producers for heating the retorts is reduced by the reduction of ash in fuel and also the improved quality of the producer gas, the reduction of clinkering periods, and the avoidance of raising the temperature of 50 lb. of ash per ton of coal carbonized to a temperature of 1,300°C.

The frequent opening of producer doors for clinkering and tickling also conduces to increased coke consumption, also a high percentage of breeze can be used with the coke for producers. With 8% of ash in the coal and 12% in the coke for producer, the fuel consumption should not exceed 3 cwt. per ton of coal carbonized, or 15%. With a 4% ash in coal or 6% in the coke, the fuel consumption would not exceed 2 cwt. or 10%. In assessing the coke for sale, one has to take into consideration the coke consumed by steaming, on the basis of 6,500 cu.ft. of B.W.G. per cwt. of coke.

(To be continued)

At the Ideal Home Exhibition



Above are two views of the De La Rue Kitchen at the Ideal Home Exhibition. Easily recognizable are the Instantaneous Multi-Point Gas Water Heater, type DLR175; the Silent Gas Refrigerator, 3 cu.ft.; and the Silent Burning "Neat" Gas Cooker with unobstructed spillage tray. The exhibit was designed by S. P. Jordan, A.R.I.B.A.

COMPANY MEETINGS

Tottenham and District Gas Company

The Annual Ordinary Meeting of the Tottenham and District Gas Company was held on Mar. 25, at Woodall House, Lordship Lane, Wood Green, N.22, the Chairman, Mr. E. C. Woodall, O.B.E., presiding.

The CHAIRMAN, in his address which had been issued to stockholders, said: I would first like to mention the changes that have been made on the Board of Directors since our last meeting. As many of you know, my father, Mr. Henry Woodall, had a rather serious illness last summer and, on medical advice, has resigned from the office of Chairman of the Company. I am glad, however, to tell you that he retains his seat on the Board and that his wide knowledge and long experience of the Gas Industry and of your Company will still be available to his colleagues. My fellow Directors have done me the honour to appoint me Chairman in his stead, an honour which I very greatly appreciate. Col. Smith, whose invaluable services to the Company and to the Gas Industry are well known to you all, has been appointed Deputy Chairman.

Your Company is now in the hundredth year of its existence. It was formed by deed of settlement in 1847 to supply gas in Tottenham and Edmonton and has gradually extended its boundaries until to-day it serves 191,903 consumers over more than 400 square miles of Middlesex and Hertfordshire.

In my view we have reached a size which enables us to enjoy the advantages of a large scale organization without altogether losing the personal touch between management and employees which is, I believe, of very great importance. I do not think that any considerable expansion would add to efficiency and I view with some dismay the prospects that, under nationalization, this Company might lose its identity in a much larger and wholly impersonal organization.

The Accounts

I think you will agree that the accounts for the year 1946 are very satisfactory. After meeting all prior charges and providing for income tax on the profits for the year there is a balance of profit including £80,308 brought in from 1945, of £212,289. The payment of preference dividends at the fixed rates and ordinary dividend at the basic rate, provision for co-partnership, pensions outside the pensions scheme and further provision for the reconstruction of Ponders End Works absorb £131,391, leaving £590 to be added to the carry forward.

After taking into account depreciation, receipts for war damage and sundry smaller items, there is added to the expenditure on fixed and long term assets an amount of £65,567. Included in this figure is £67,760 invested in our associated undertaking, the Dunstable Gas and Water Company. If this item is excluded, the expenditure on capital account has been reduced by £2,193 and stands at the low figure of £386 per million cu.ft. of gas sold.

Turning to the revenue account you will notice that we have spent over £68,000 more in service to consumers. The return of employees from H.M. Forces and an increased supply of gas appliances have enabled us to give quicker and better service. We are doing our best to attend to the needs of our consumers although present-day restrictions prevent us from doing all that we should like to do. Under the heading of employees' welfare there is a net increase of £15,834. This is accounted for partly by increased contribution under the National Insurance Act, 1946, and partly by payments under the Sick Pay Scheme which was referred to by your Chairman last year. The scheme was put into operation on Jan. 1, 1946, and is much appreciated by our employees. The balance sheet reflects the financial strength of your Company. Provision has been made for all known liabilities, our statutory funds are well invested, and current assets exceed current liabilities by the substantial sum of £682,113. During the year under review 565 employees returned to the service of the Company from H.M. Forces. We are very glad to welcome them back and do our best to make the transition from service to civil life as easy as possible.

Reconstruction

Works and plant have been well maintained. Schemes for further development estimated to cost £1,775,000 have been approved by the Board and of which work to the value of £850,000 has already been put in hand. During the war years it was the policy of the Directors to keep all plant and machinery in as good a state of repair as possible, having regard to all the difficulties due to restrictions on the use of labour and materials, and also in addition to install as much new plant as was permitted under the stringent controls by which we were, and still are, bound.

We always anticipated that after the war the demand for gas would be increased considerably, and as a result of our policy we found ourselves able to maintain a full supply during the very cold spell which occurred in December last. We broke all records repeatedly and on many days our output of gas exceeded our production by several million cubic feet. In spite of this, we were able to satisfy all demands made on us, demands unprecedented in the history of the Company.

This affords a striking example of the resilience of the Gas Industry which is able to store gas cheaply and efficiently and from the stocks accumulated to meet demands in excess of production for many days on end. If it were not for this facility for storing gas which is provided by our gasholders, it would be necessary to build and maintain in commission, at high cost, production plant far in excess of that which we possess to-day.

The hard weather of December, 1946, was, as you are well aware, repeated in the first three months of this year and the resulting demand for gas has called for the greatest efforts on the part of our engineering staff and those engaged on our works. I should like to take this opportunity of thanking them all, both on your behalf and on behalf of the Directors, for the way in which they have worked and for their determination not to let our consumers down.

Unfortunately, since the outbreak of war, we have had no control over our purchases of coal, but have been compelled to accept such quantities and qualities as have been made available to us by the Government. The result is that despite repeated representations, our coal stocks at the beginning of December were only some 30% of what we should have held had we been free agents. Consequently, during January and February, 1947, we have been living from hand to mouth and in common with all other gas undertakings in the country, were requested by the Ministry of Fuel and Power to reduce our pressures in order to conserve coal. This we did, although I can assure you it went very much against the grain as we have always set ourselves out to install sufficient plant and maintain adequate stocks to enable us to supply consumers with all the gas they require. Naturally, this is required most when the temperature is lowest.

The Future

Unfortunately, we canot tell what that future may be. So far the Government have produced no plan for the Gas Industry, and we can only surmise that it will follow the general lines of the Electricity Bill, under which, if it is passed as it stands, stockholders will suffer a serious diminution in income and will lose the capital appreciation to which they are reasonably entitled to look forward.

In this Company we have 4,256 ordinary stockholders. Of these, 978 have holdings between £5 and £10, 1,255 hold between £15 and £50, and 500 between £55 and £100. Thus 64% of our stockholders hold less than £100 worth of stock. Of the remaining 36%, 755 have holdings between £105 and £300, 342 between £305 and £500, and 258 between £505 and £1,000. Only 168 or 4% have holdings of more than £1,000; these are principally companies and corporations who, from the nature of their business have large sums to invest. Thus, it is not the rich speculator who stands to lose but rather the ordinary thrifty person who, not seeking sensational returns, has been content to invest his savings in an undertaking which he trusts to provide a modest and safe return on his money. While the Company can take no part in party politics which must be a matter for the individual, your Directors will do everything in their power to protect the interests of the stockholders, and with them, those of our employees.

If nationalization, with its apparently inevitable injustice to stockholders, is to be brought about I think we are entitled to ask what benefits are to flow from it. On this important point its advocates are dumb. Your Directors are unable to see that any advantage can accrue to consumers, employees or stockholders from a change of ownership, particularly at this time when all the energies of the country are required to bring us out of the very serious position into which we have fallen and which the events of the last few weeks have so bleakly emphasized. Such a change can only have the effect of throwing an even heavier burden on a Civil Service already strained to breaking point, and of producing uncertainty and dislocation in an industry which has consistently given good service to the public.

Our policy will continue to be to maintain your Company in the highest possible state of efficiency. In this endeavour I know that we can rely on all our employees for the same loyal and efficient service as they have given in the past both to the Company and to the community which it serves.

The report and accounts were adopted, and final dividends were declared at the rate of 2½% actual on the 5% preference stock (making 5% for the year), 2¾% actual on the 5½% preference stock (making 5½%) and 2½% actual on the ordinary stock (making 5%), all less tax.

Mr. Henry Woodall and Mr. C. S. Pryor, who retired by rotation, were re-elected Directors, and Lieut.-Colonel W. C.

Smith, D.S.O., M.C., F.C.A., the retiring Auditor, was re-appointed.

On the proposition of Mr. S. L. Sandell, seconded by Captain H. F. Wilkinson, it was unanimously agreed to increase the remuneration of the Auditors.

A vote of thanks was accorded to the Chairman, Directors, officers, staff, and workpeople for their united efforts during the past year.

British Gas Light Company

The 216th Ordinary General Meeting of the British Gas Light Co., Ltd., was held at the Chief Office of the Company, 2, The Abbey Garden, Westminster, S.W.1, on Wednesday, Mar. 26, Mr. HENRY WOODALL, M.Inst.C.E. (Chairman and Managing Director), presiding.

In the absence of the Secretary (Mr. A. J. MUMFORD), who was absent through illness, the Assistant Secretary (Mr. F. T. BROOKES) read the notice convening the meeting, together with the reports of the Auditors. The Directors' report and statement of accounts for the year ended Dec. 31, 1946, were taken as read.

The CHAIRMAN, moving the adoption of the report and accounts, said: I am extremely sorry that Mr. Mumford is not here to-day. He has been ill for a long time, and has pluckily tried to do more than he should have done. I am sure it would be your wish that I should send him a message from this meeting to say how sorry we are that he is still unwell.

At this the 216th Ordinary General Meeting of our Company I am able to present to you very satisfactory accounts and in doing so to give you a summary of our activities for last year.

Before I deal with the accounts, here are some figures of gas sales which speak for themselves. At Hull we sold 23% more gas than in 1945 and 20% more than in 1938. The extent of the recovery at this station can be measured by the fact that the 1,836 million cu.ft. sold in 1946 was nearly double the quantity sold in 1941. At Norwich we sold 11% more than in 1945 and 43% more than in 1938. For the first time in the history of this station sales exceeded 1,000 million cu.ft. in a year. The total sales of gas at all our undertakings—stations and subsidiaries—in 1946, was 4,514 million cu.ft., which is 14½% more than in 1945 and 38% more than in 1938. It should be remembered that these increases took place in a year when our efforts were directed towards persuading consumers to reduce consumption rather than increase it.

The result of the year's working is that after meeting all charges and preference dividends there is £34,447 to be added to the £77,259 brought forward from the last account, making £111,706 available for ordinary dividends. An interim dividend of 3½% was paid on Oct. 4, 1946, and the Directors now recommend the payment on April 3 of a final dividend of 4%, making 7½% for the year, less income tax. This total rate of 7½% is the same as we paid last year and was our established rate for many years up to the war. This will leave £76,437 to be carried forward, a reduction of £822 on the amount brought in.

The Accounts

The accounts have been in your hands for some days, and you will have noticed that we have adopted the custom of showing corresponding figures for the previous year. I shall comment on two figures only in the profit and loss account; these are on the credit side, namely, profits transferred from Gas Undertakings £119,799, and amount drawn from Norwich Reserve Fund £9,822. These figures are related and require an explanation to be properly understood. We, in common with most gas undertakings, are limited by Parliament in the amount of profit which can be taken in any year from our statutory undertakings. When we make, at an individual station, more profit than Parliament allows we must put the surplus to a reserve fund, and when we make less we may, and do, take the amount of the deficiency from the reserve fund if it is there or, if not, we note that we were deficient in profit and take it out of the earnings of succeeding years as the profits allow. As I mentioned to you earlier, there was, during the war, an enormous fall in the sales of gas at Hull, and this brought with it a deficiency in profits—there was no reserve fund at that station so we had to make a note of the amounts by which we were short and wait for a return of better times. With the great recovery in sales during the last year or two we have been able to make, not only our Parliamentary interest at that station, but sufficient to recoup ourselves in respect of these past deficiencies. We finished doing this in 1946, so that we shall now be able to take only the exact Parliamentary interest from this station—about £54,000 a year.

On the other hand, at Norwich, we resorted to our reserve fund to the extent of £9,822 this year in order to obtain the full Parliamentary interest. I have given you this detailed explanation because the transactions in and out of these station reserve funds are sometimes misinterpreted. The figure of £119,799 for profits transferred from gas undertakings is the amount we have taken from our directly owned stations, after we have provided in their individual accounts not only for all the usual costs but for a great deal of exceptional expenditure as well. To refer again to our two main stations, Hull and Norwich, at both we have been engaged on very heavy programmes of retort reconstruction and renewal, and, before we struck our balances, we charged against the revenue of these two stations during 1946 over £73,000 in respect of such exceptional expenditure—nearly £52,000 at Hull and over £21,000 at Norwich.

Strong Financial Position

In the balance sheet there is not a great deal to which to call your special attention except the very strong position which it reveals. You will see that the total of reserves and undistributed profits is now over £800,000, and you will find on the other side, under investments, that we have more than £373,000 in Government securities. The corresponding figures at the end of 1938 were £650,000 for reserves and £236,000 invested in Government securities, so that our financial position is even stronger than before the war.

You will notice that the value of our fixed assets has increased during the year by over £100,000. This is a net figure after we have made adequate provision for depreciation. The reason for this increase is that with the end of the war we are again able to embark on limited capital expenditure which is the corollary of expansion. I use the word "limited" advisedly. As I told you last year, we have many schemes for capital works and for linking up our undertakings, on which we should not have hesitated to expend capital if we had been allowed to do so. Unfortunately, controls and lack of materials still hamper us in every project. To put up new carbonizing plant now involves a delay of about three years from the date of order; before the war the period was one year. Much of this capital expenditure is on mains, services, cookers and gas burning appliances for new houses. These will involve a great deal more money, as the housing programme expands. Shortly before the war we had embarked on a scheme for exchanging in due course every black "free" cooker on the districts for a more efficient, semi-enamelled, cooker, each of which cost about £5. When the war stopped us we had spent nearly a quarter of a million pounds on this project. During 1946 we managed to have the cooker put on to the "Blanket Order" scheme of the Ministry of Works, so that it is now available to us in sufficient numbers for equipping the new houses—the cost of the cooker to-day is, however, about £11.

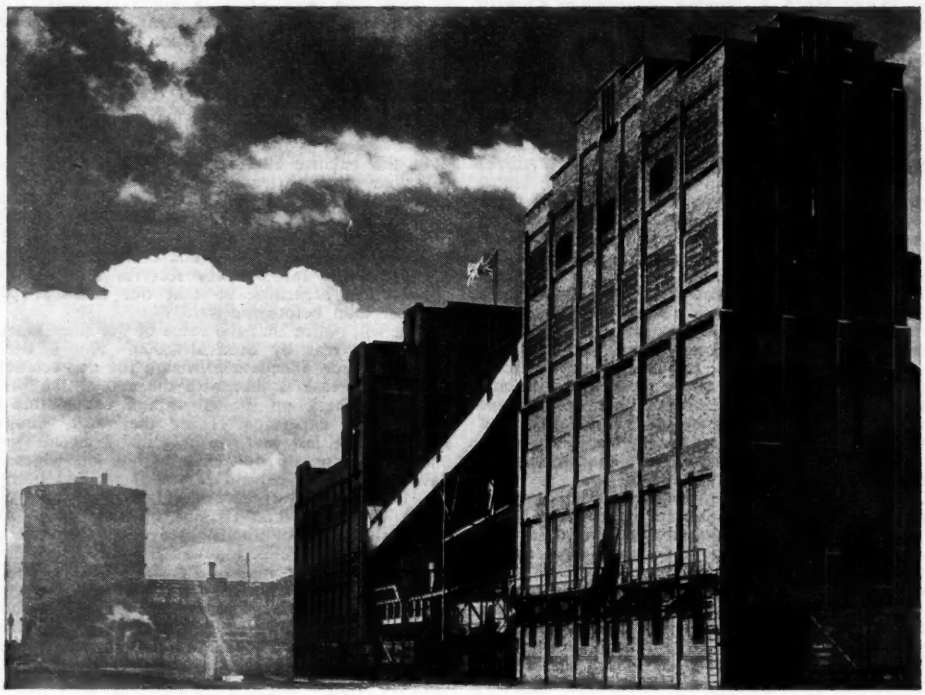
Our method of financing our subsidiary companies' expenditure of this nature is by way of temporary loan, and this accounts for the net increase of £32,000 in this item during the year.

It is unnecessary to deal with other individual variations between the figures for this year and last year. If any stockholder desires information on any particular item we shall welcome questions later. I hope I have said enough to satisfy you that the financial strength and stability of this old Company is as great as ever.

Shortage of Solid Fuel

Undoubtedly the shortage and rationing of solid fuel account for some of the increases in sales which we, in common with nearly all gas companies, have experienced, but I see no reason to suppose that the demand will fall off—indeed ,all the indications are of continued expansion. A great deal of the expenditure on mains and services for new houses is made in advance of their occupation, and has still to become productive. The greater spending power of the people, and the enforced change from solid fuel, together with lack of help in the house, will ensure that many who have turned to gas for cooking and heating will not go back to the old conditions. The impossibility of expanding plant during the war years, and the delays met with since, have made it very difficult for gas companies to meet the demand. Much war damage has still to be repaired. It is the same story at all works—every piece of plant in use all making gas to the full. This has meant a degree of improvisation hitherto undreamed of, and the men in the Industry have shouldered the additional burdens of worry and responsibility in a way which should earn for them the gratitude of every gas consumer in the Kingdom. I do feel very strongly that we should never have got this work done in the same kind of way if our works had been nationalized. There is undoubtedly a feeling among our workmen that as we are an old Company with a tradition of 124 years they are going to stick it, and they are not going to let the Company down. That is one of the things I think we should remember when we consider nationalization. I can hardly think that the ordinary civil servant would feel the same way.

You as stockholders will have the opportunity of expressing your thanks to our staff and employees—never have they deserved it more. We have, in our organization, undertakings of all sizes. In each the problem has been the same—to make the gas demanded from them. Inevitably there have been occasions when it has been beyond us, but our consumers have invariably realized the difficulties, and we are grateful to them for their generous understanding.

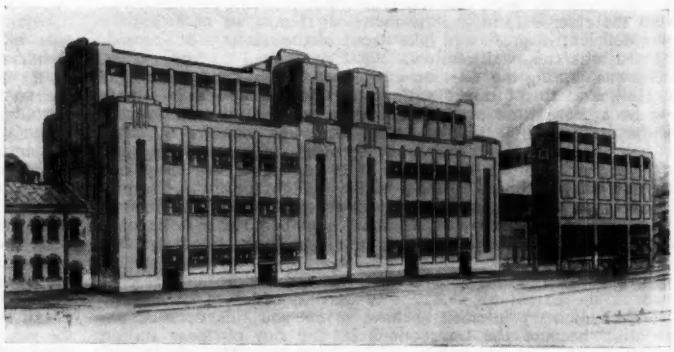


GLOVER-WEST *Vertical Retorts at* COVENTRY

"It is no longer considered necessary that the buildings housing Gas Works plant should be of a purely utilitarian character. For comparatively little extra expenditure it is possible for these buildings to be of such a character as to maintain and even raise the prestige of the Gas Industry in the eyes of the consumer and of the public as a whole."

COMMUNICATION No. 230—PROCEEDINGS OF THE INSTITUTION OF GAS ENGINEERS, 1939-40.

In this photograph of the fourth Installation of Glover-West Vertical Retorts at the Foleshill Works, Coventry, the coke storage hoppers with screening plant above are seen in the foreground. The retort house lies to the left. Space between is reserved for the duplication of the carbonizing plant. The project for the complete installation is sketched below.



West's Gas Improvement Co., Ltd.

Miles Platting, MANCHESTER 10

Telephone: Collyhurst 2961-2-3-4-5.
Telegrams: Stoker, Manchester.

London Office:
COLUMBIA HOUSE, ALDWYCH, W.C. 2.

Telephone: Holborn 4108-9.
Telegrams: WESGASCO, ESTRAND.

The recent national fuel crisis has drawn attention to the lack of sufficient quantities of coal for public utility undertakings, and to the deplorable quality of a great deal that we do receive. The hand to mouth policy in coal stocks is not of our making. For years we have only been able to have the quantity and quality of coal which has been directed to us. In the days when we could control such matters we used to start the winter with a stock which would cover as many weeks as it has covered days in recent years.

Public utility companies have been warning the nation that more coal is essential if our economy is to survive. Recent events have justified our forebodings. This problem must be solved, as also must those of the formulation of a national wages policy and the attainment of a greater output per man hour in every industry.

Coal Stocks

We have been told that the margin by which the nation was short in its coal stocks at the beginning of this winter was the comparatively small figure of five million tons. The problem of the future is to bridge this gap between safety and disaster. It is doubtful how far this can be achieved by increased production, but, as was pointed out by the Governor of the Gas Light and Coke Company, Mr. Michael Milne-Watson, in a letter to *The Times* of Mar. 7, it behoves us, in future years, to conserve coal and use it in an efficient manner. Before the war domestic consumers used in a year 45 million tons, and even with rationing in 1946 the figure was 31 million tons. For every ton of this coal processed in the gasworks it would be possible to produce for sale 75 therms of gas, 9 or 10 cwt. of coke, 2 or 3 gallons of benzole, and 10 or 12 gallons of tar, which latter by-product, in turn, is the basis of so many valuable materials for our chemical industry.

Every effort should be made to educate the domestic consumer to burn less coal in the open hearth, with its consequent wastage of so much that is valuable and its pollution of the atmosphere. Gas on tap is not only an efficient and reliable substitute for coal to cook our meals and heat our rooms, but it entirely removes, for the housewife, the drudgery which accompanies the open hearth. Where circumstances dictate a solid fuel, coke, which is smokeless, should be chosen, as is increasingly the case.

Nationalization

The threat of nationalization has now been with us for nearly two years and there is still nothing definite to report as, although we have been repeatedly told that gas is to be nationalized, we have no knowledge as to the date or method which will be employed. Our Company is a member of the British Gas Council, who are taking every opportunity to put before the Minister the views of the Industry, and we shall continue to support them. You may be assured that everything will be done to see that the interests of consumers, employees, and stockholders are safeguarded as far as is possible.

It is the considered view of your Directors that any advantages claimed for nationalization could be achieved by far less revolutionary methods, within the Industry, thus avoiding an upheaval which is to be deplored at this difficult time in the affairs of the nation. We still maintain that nationalization is neither wise nor inevitable.

Mr. H. G. PALMER, Deputy-Chairman, seconded the adoption of the report and accounts.

Mr. HYDE C. BURTON said he had hoped to hear a little more on the subject of nationalization, because there seemed to him to be a feeling in the Gas Industry that it was not worth fighting. He had tried in a humble way to fight a very lonely battle.

He hoped that the whole Industry and the British Gas Council would organize stockholders' protection associations so that every stockholder would know the implications involved, and that the matter would be put before the employees so that they could understand a little of what the economic structure of the country depended on, namely, higher output and co-operation between employer and employee. The Chairman had assured them that the interests of consumers, employees, and stockholders would be safeguarded as far as possible and he hoped that in pursuing that object they would do all they could to make people understand the implications of the proposals which they all knew, in the long run, were going to be disastrous.

The report and accounts were then adopted, and the dividend resolutions as indicated in the Directors' report were carried unanimously.

The retiring Directors, Mr. H. G. Palmer and Mr. A. J. Mumford, were re-elected ,and the Auditors, Messrs. Cash, Stone, and Company, were re-appointed, Mr. William Cash, Jun., briefly acknowledging this renewal of confidence.

Vote of Thanks

Mr. H. G. PALMER proposed a vote of thanks to the Secretary, officers, staff, and workpeople of the Company. He said that during 1946 he did a great deal of travelling and visited many of the Company's stations as well as works of the subsidiary companies. They had had many trials and tribulations, not the least of which were the delays in getting licences and in getting the materials to do the repairs and reconstruction which were so urgently needed. All these things were very worrying, but everybody had tackled his job with remarkable cheerfulness and efficiency.

Mr. E. C. WOODALL seconded the vote of thanks, which was carried with acclamation.

The ASSISTANT SECRETARY, acknowledging the vote of thanks on behalf of all concerned, said the Chairman had stressed what a difficult year it had been, and he need not add to that in any way. He wished to say, however, that they were inspired by the knowledge that they had over them a Board of Directors on whose sympathy and understanding they could rely in those difficulties. The Company was noted throughout the Industry for the kindliness and friendship that existed from top to bottom, and they could not help feeling that they would lose a great deal if nationalization came about. He would have the greatest pleasure in conveying the vote of thanks to all concerned.

Mr. HYDE C. BURTON proposed a vote of thanks to the Chairman and Directors for their able management of the Company's affairs. The balance sheet showed a very fine financial position, and it was a tribute to Mr. Henry Woodall and his colleagues that the position was so good.

Mr. K. R. MACKAY seconded and the resolution was carried unanimously.

The CHAIRMAN briefly replied.

1947 "Journal" Directory

In order to keep the Directory information up to date, the following alterations and corrections which have been notified during the past month should be noted in the 1947 issue of the "JOURNAL" Calendar and Directory.

Page 14—BRIDGNORTH. E. H. Hart, *E. and M.*, resigned.
„ 14—BRIGHOUSE. R. W. Foulds, *E. and M.*, vice J. G. Tilley, resigned.
„ 20—CHEADLE AND CHURNET VALLEY. C. L. Baines, *M. and S.*, retired.
„ 88—DUNDEE. W. S. Johnston, *E. and M.*, vice J. Dickson, retired.
„ 94—LOCKERBIE. S. C. Coubrough, *E. and M.*, vice J. Webster, resigned.
„ 162—BRITISH GAS STAFF ASSOCIATION. *Gen. S.*, F. C. Henfrey-Smith. *National Organizer*, H. J. Arnold.
„ 165—LONDON AND COUNTIES COKE ASSOCIATION. J. H. Cooke, *G.M.*, vice W. L. Boon, resigned.

Gas Products Prices

The London Market

Mar. 28.

There are no changes to report in the prices of Coal Tar products.

The Provinces

Mar. 31.

Average prices for gas-works products: Pitch, 75s. per ton; toluole, naked, North, 90's, 2s. 4d. to 2s. 6¾d. per gall.; pure, 3s. 2¼d. Prices for carbolic acid 60's anthracene, creosote oil (hydrogenation), coal tar oils (timber preservation, &c.) and strained anthracene oil are controlled by Government Orders. Prices for road tar are increased by one penny per gall. by S. R. & O., 1947, 177, under which Order there are also increases in the prices of naphthalene.

Scotland

Mar. 29.

Enquiries are numerous with prices firm. *Refined* Tar.* Yield to the distiller is 6d. per gall. ex works, naked. *Creosote Oil.* Timber preserving quality*, 5½d. to 6½d. per gall.; Hydrogenation Oil,* 5⅝d. per gall.; Low Gravity or Virgin Oil,† 7¼d. to 7½d. per gall.; Benzole Absorbing Oil, 6½d. to 8d. per gall. *Refined Cresylic Acid* is 3s. 6d. to 4s. 6d. per gall. ex works, naked, according to quality. *Crude Naphtha*,† 7d. to 8d. per gall. *Solvent Naphtha.** Basic maximum prices delivered in bulk 90/160 grade, 2s. 10d. per gall., and 90/190 Heavy Naphtha, unrectified, 2s. 0½d. per gall.; Rectified, 2s. 4d. per gall. *Pyridine*,† 90/160 grade, 15s. per gall., and 90/140 grade, 17s. per gall.

* Price controlled. † Uncontrolled.